ISSN (print) 0093-4666 © 2012. Mycotaxon, Ltd. ISSN (online) 2154-8889

MYCOTAXON

http://dx.doi.org/10.5248/122.51

Volume 122, pp. 51–59 *October–December 2012*

Aphyllophoroid fungi from Sonora, México 2. New records from Sierra de Álamos–Río Cuchujaqui Biosphere Reserve

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Abstract — *Gyrodontium sacchari, Leiotrametes menziesii*, *Phellinus glaucescens*, and *P. shaferi* are described as new records from México. The specimens were collected on dead or living wood in tropical deciduous forest in the Sierra de Álamos–Río Cuchujaqui Biosphere Reserve located in Sonora State, México.

Key words — *Trametes*, taxonomy, chorology

Introduction

The Sierra de Álamos–Río Cuchujaqui Biosphere Reserve has an extension of 92,899 ha and is located in south of State of Sonora, México. It presents an extraordinary biological richness, with approximately 1100 species of plants distributed in xerophilous scrub, tropical deciduous forest and oak-pine forest (CONANP 2007). The aphyllophoroid fungi are heterogeneous groups of several taxa of macrofungi that are very abundant in this region, mainly on live and dead wood. In this study four species are described for the first time for México: *Gyrodontium sacchari* (*Coniophoraceae, Boletales*), *Phellinus glaucescens* and *P. shaferi* (*Hymenochaetaceae, Hymenochaetales*), and *Leiotrametes menziesii* (*Polyporaceae, Polyporales*).

Materials & methods

The examined specimens were collected from Sonora State in September 2006 and are deposited in ENCB Herbarium with duplicate in CESUES. Herbarium ENCB is

abbreviated according to Thiers (2012). Morphological examinations followed protocols outlined by Ryvarden (1991) and Cifuentes et al. (1986). Keys in parentheses after colors in basidioma descriptions follow the Methuen Handbook of Colour (Kornerup & Wanscher 1978). Measurements of anatomical characters were taken from rehydrated tissues in 5% aqueous KOH and amyloid reactions were taken with Melzer's reagent. Longitudes and latitudes were obtained with GPS etrex (garmin). Line drawings were made to scale using a camera lucida attached to a light microscope. The macro-photos were taken with a Nikon Coolpix 4300.

Taxonomy

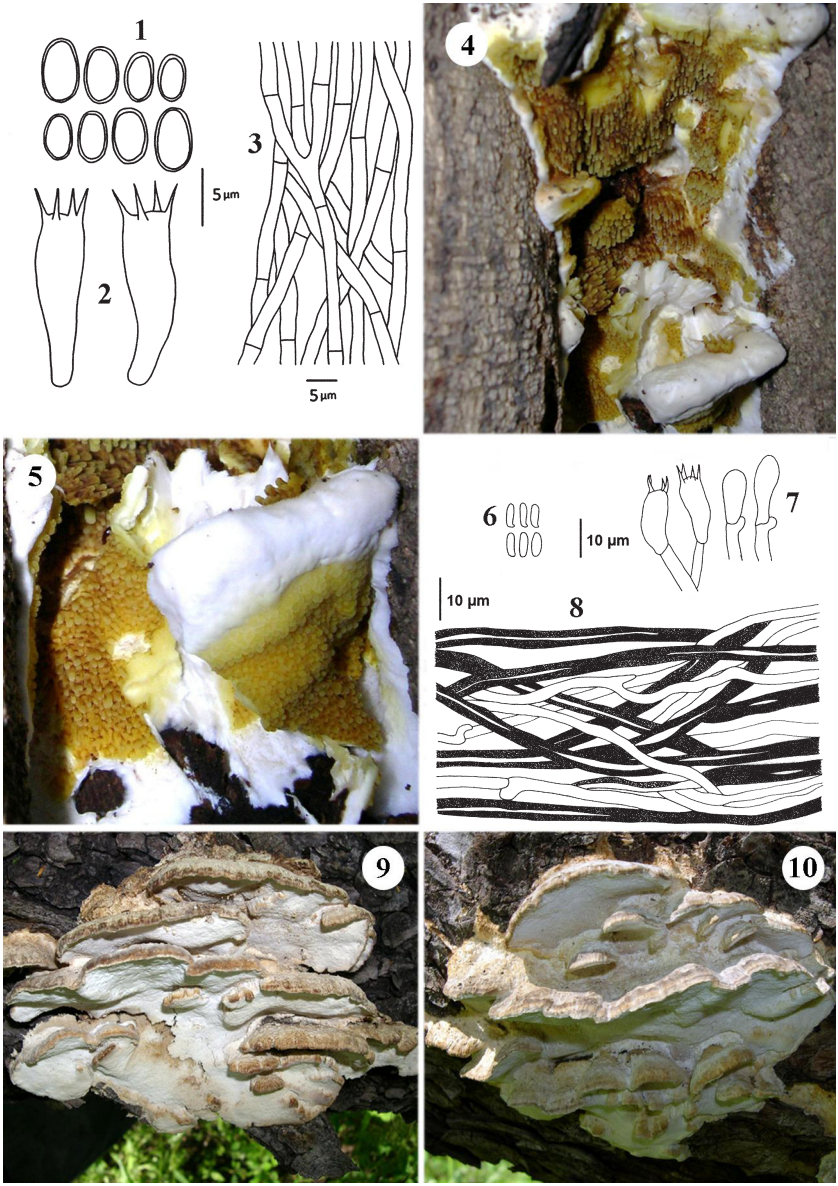
Gyrodontium sacchari (Spreng.) Hjortstam, Mycotaxon 54: 186, 1995. FIGS 1–5

BASIDIOMES annual, 40–50 mm broad and up to 100 mm long, resupinate to effuse-reflexed, subpileate to pileate, fleshy to spongy, easily separable from the substratum. PILEUS poorly to well development, conchate in some parts, soft to spongy, white. MARGIN obtuse and thick in pileus, acute at effused parts, sterile, membranaceus, spongy to cottony, white, width, up to 12 mm. HYMENOPHORE tuberculate appearance in young parts, aculeate to distinctly hydnoid in mature parts; aculei mainly flattened, some cylindrical, up to 5 mm long, yellow (2-3A8), sulphur yellow (1A5), olive yellow (2-3D8) to olive green (3D7), reddish-brown (8E8) when the spores covering the surface. CONTEXT or subiculum up to 5 mm thick, soft to spongy, cottony, white.

HYPHAL SYSTEM monomitic; GENERATIVE HYPHAE simple septate, hyaline to yellowish in KOH, inamyloid, simple to branched, mainly thin-walled, some thick-walled, 2.4–8 µm diam. HYMENOPHORAL TRAMA with parallel to subparallel hyphae, hyaline to yellowish in KOH, simple to slightly branched, thin-walled, 2.4–4.8 µm diam. CONTEXTUAL HYPHAE slightly interwoven, hyaline in KOH, simple to branched, thin to thick-walled, 4–8 µm diam. CLAMP CONNECTIONS absent. CYSTIDIA absent. BASIDIA 10.8–15 × 4–6.4 µm, clavate, hyaline in KOH, tetra-spored, sterigmata up to 3 µm long. BASIDIOSPORES 4–5.6 × 2.4–3.2 µm, ellipsoid to elongate, yellowish brown in KOH, inamyloid to weak dextrinoid, thick-walled, smooth.

ECOLOGY & DISTRIBUTION— *Gyrodontium sacchari* grows on live legume wood in tropical deciduous forests, causing a brown rot. Carlier et al. (2004) mentioned that this pantropical species has been recorded on all continents. It is known from Ethiopia, Tanzania, and Zimbabwe in Africa (Hjortstam 1987, Carlier et al. 2004), Thailand (Carlier et al. 2004) in Asia, from Guadeloupe, Brazil (Hjortstam 1995) and French Guyana (Carlier et al. 2004) in South America. In México it was found in the municipality of Álamos, Sonora State.

REPRESENTATIVE SPECIMEN EXAMINED — **MÉXICO. SONORA: municipality of Álamos**, Palo Injerto (27°02′50.9″N 108°43′57.9″W) elev. 425 m, 13.IX.2006, R. Valenzuela 13068 (ENCB, CESUES).



Figs 1–10: ***Gyrodontium sacchari***: 1. Basidiospores. 2. Basidia. 3. Hyphae of hymenophoral trama. 4–5. Basidiomes. ***Leiotrametes menziesii***: 6. Basidiospores. 7. Basidia. 8. Hyphae of hymenophoral trama. 9–10. Basidiomes.

Comments— *Gyrodontium sacchari* is characterized by a resupinate to an effuse-reflexed basidiome, yellow to olive green hydnoid hymenophore, monomitic hyphal system with simple septate generative hyphae, and small thick-walled smooth yellowish brown basidiospores. The monotypic *Gyrodontium* can be confused with *Serpula* species, but the meruloid hymenophore and clamped generative hyphae easily separate both genera (Hjortstam 1987). Phylogenetic analysis indicates that *Gyrodontium* and *Coniophora* share clampless generative hyphae and are related, but *Coniophora* has a smooth hymenophore and forms exclusively resupinate basidiomes (Carlier et al. 2004).

Leiotrametes menziesii (Berk.) Welti & Courtec., Fungal Diversity 55: 60, 2012

Figs 6–10

Basidiomes annual, 60–120 x 30–70 x 10–30 mm, pileate-sessile, imbricate, connate, corky in consistency. pileus dimidiate to broadly attached, conchate, semicircular, velutinous to glabrous, azonate or with narrow zones to the margin, whitish, pale yellow (4A2, 4A3) to ochraceous yellow (5C7) with brownish grey (5D7) in young specimens, ochraceous yellow (5C7), orange grey (5B2), grayish orange (5B3), brown (6E4) with spots grayish brown (6E3), brownish gray (6E2) to gray (6E1) in mature specimens. margin sterile, thin, acute, lobed in some specimens, recurved, whitish to brown (6E8) or dark brown (7F4); pale gray (5D1) to black in dry specimens. hymenophore poroid, white to cream color (4A3), with tones straw yellow (4A4) in some parts, gray (5D1) or pale brown (6D3) in others; pores rounded to irregular in shape, 5–7 per mm, with the dissepiments entire to slightly lacerated; tubes up to 10 mm deep, concolorous with the pores. context up to 20 mm thick, homogeneous, dense, zonate, white to pale yellow (4A2, 4A3).

Hyphal system trimitic, generative hyphae with clamp connections, hyaline in KOH, inamyloid, simple to branched, thin-walled, 2.4–3.2 µm in diam.; skeletal hyphae hyaline in KOH, inamyloid, unbranched, thick-walled to solid, 3.2–6.4 µm in diam., some swollen up to 10 µm broad; binding hyphae hyaline in KOH, inamyloid, thin-walled to thick-walled, very branched, 2.4–4 µm diam. hymenophoral trama with interwoven hyphae, generative hyphae hyaline, thin-walled, simple to slightly branched, 2.4–3.2 µm wide; skeletal hyphae yellowish hyaline, unbranched, thick-walled, 3.2–5.6 µm broad; binding hyphae hyaline in KOH, inamyloid, thin-walled to thick-walled, very branched, 2.4–4 µm diam. contextual hyphae very interwoven, generative hyphae hyaline, simple to branched, thin-walled, 2.4–3.2 µm wide; skeletal hyphae hyaline, unbranched, thick-walled to solid, 3.2–6.4 µm in broad; binding hyphae hyaline in KOH, inamyloid, thin-walled to thick-walled, very branched, 2.4–4 µm diam. sterile cells absent. basidia 12–16 × 4.8–6.4 µm, clavate, tetra-spored, hyaline in KOH, with sterigmata up to 4 µm long.

BASIDIOSPORES 4.4–6.4 × 1.5–2.4 µm, cylindrical, hyaline in KOH, inamyloid, thin-walled, smooth.

ECOLOGY & DISTRIBUTION— *Leiotrametes menziesii* grows on dead legume wood in tropical deciduous forests and causes a white rot. Ryvarden & Johansen (1980) regard this species, widely distributed in Africa, Asia, Australia, and Pacific Islands, as paleotropical. It has been cited (as *Trametes menziesii*) from Malaysia (Corner 1989), Papua New Guinea (Quanten 1997), and (in South America) Costa Rica (Carranza & Ruiz-Boyer 2005), Guyana (Aime et al. 2003), and Martinique (Welti et al. 2012). The most northernmost report of *L. menziesii* is from two sites in Sonora state, México.

REPRESENTATIVE SPECIMEN EXAMINED — **MÉXICO. SONORA: municipality of Álamos**, El Aguaje (26°56′45.9″N 108°45′48.9″W) elev. 450 m, 14.IX.2006, R. Valenzuela 13106 (ENCB, CESUES); El Platanar, (26°59′26.7″N 108°40′40.4″W) elev. 635 m, 14.IX.2006, R. Valenzuela 13137 (ENCB, CESUES).

COMMENTS— *Leiotrametes menziesii* is very variable in basidiome size, shape, and color, but it can be distinguished by the numerous gray tones (mainly towards the base) in mature specimens and spore size. Quanten (1997) mentioned the size differences for basidiospores cited by Cunningham (1965), Ryvarden & Johansen (1980), and Corner (1989), and the Mexican specimens are very close to or within the range given by these authors. The morphological features of Mexican specimens agree with those given by Ryvarden & Johansen (1980) and Quanten (1997).

Phellinus glaucescens (Petch) Ryvarden, Norw. Jour. Bot. 19: 234, 1972. FIGS 11–15

BASIDIOMES perennial, 80–100 × 45–60 × 5–8 mm, resupinate, becoming widely effused, adnate, corky. MARGIN sterile, up to 1 mm wide, dark brown (6F5) to black with age, matted, fimbriate. HYMENOPHORE poroid, cracked with age, PORES circular to angular, 6–8(–9) per mm, grayish brown (7D3-4) (8D3), light brown (6D8), golden brown (5D7), yellowish brown (5E7), cocoa brown (6E6), umber (6F6) to dark brown (6F7), iridescent, light brown (6D5) when moved, edges thin and entire; TUBES up to 7 mm deep, indistinctly stratified, tough to woody, yellowish brown (5E7), cocoa brown (6E6) to reddish brown (8E8). CONTEXT or subiculum up to 1 mm thick, yellowish brown (5E8) to reddish brown (8E8), fibrous, tough, azonate.

HYPHAL SYSTEM dimitic, GENERATIVE HYPHAE simple septate, hyaline to pale yellow in KOH, simple to slightly branched, thin-walled, 1.6–3.2 µm in diam; SKELETAL HYPHAE yellowish brown to reddish brown, unbranched or with rare branched, thick-walled, 3.2–5.6 µm in diam. HYMENOPHORAL TRAMA with parallel to subparallel hyphae, generative hyphae hyaline to pale yellow in KOH, thin-walled to thick-walled, simple to slightly branched, 2.4–4 µm wide; skeletal hyphae yellowish brown to reddish brown in KOH, unbranched,

thick-walled, 3.2–5 µm in diam. CONTEXTUAL TRAMA with slightly interwoven hyphae, generative hyphae hyaline in KOH, simple to scarcely branched, thick-walled, 1.6–2.4 µm wide; skeletal hyphae pale yellow in KOH, unbranched, thick-walled, 2.4–3.2 µm in diam. HYMENIAL SETAE 14-20 × 4.8-6.4 µm, ventricose to ventricose-rostrate, reddish brown to dark brown, thick-walled. BASIDIA 10–14 × 5.6–6.4 µm, clavate, tetra-spored, hyaline in KOH. BASIDIOSPORES 4–4.8 × 3.2–4.0 µm, broadly ellipsoid to subglobose, pale yellow to yellowish brown in KOH, inamyloid, slightly thick-walled, smooth.

ECOLOGY & DISTRIBUTION— Solitary, growing on dead angiosperm wood in tropical deciduous forests. This species is also known from Africa and Asia (Ryvarden & Johansen 1980, Larsen & Lombard 1988, Larsen & Cobb-Poulle, 1990). The first record from the Americas is in México, where *P. glaucescens* was found in the State of Sonora.

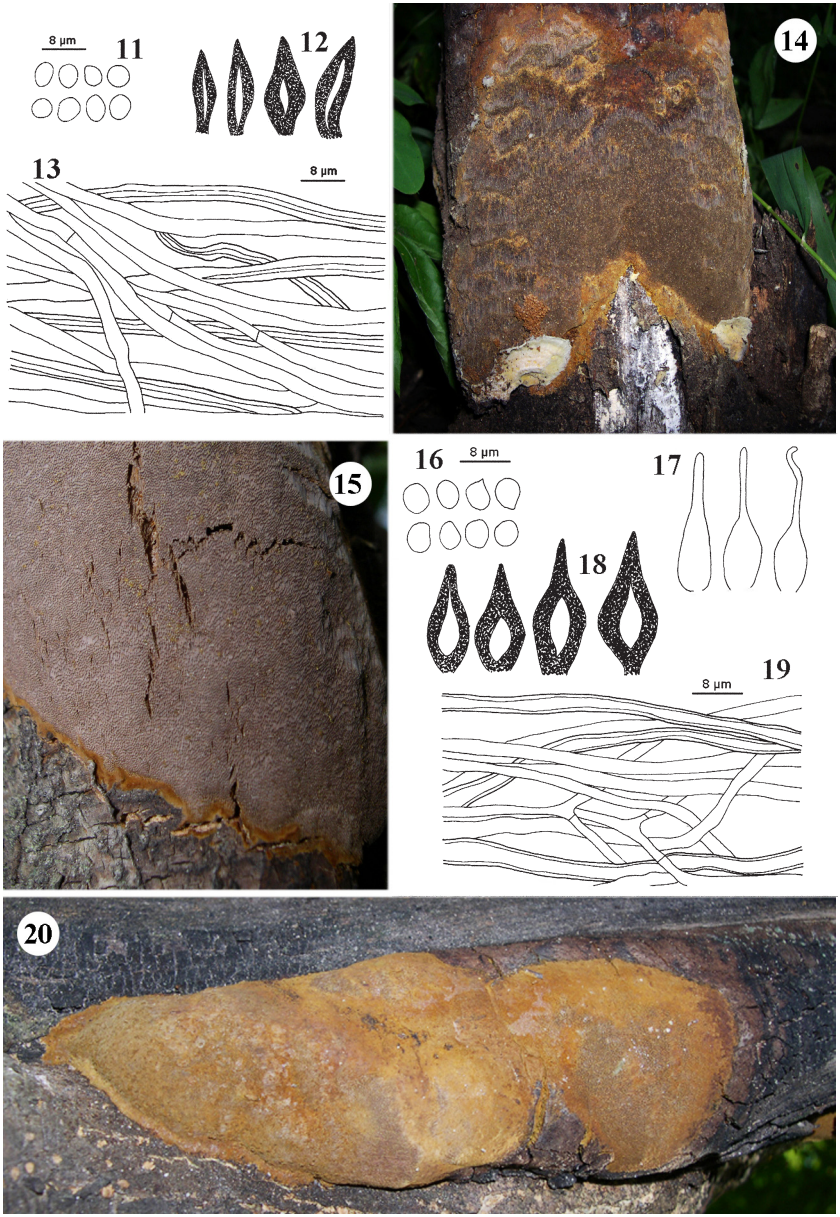
REPRESENTATIVE SPECIMEN EXAMINED — **MÉXICO. SONORA: municipality of Álamos**, El Sabinito (27°00′5.5″N 108°48′14.2″W) elev. 377 m, 16.IX.2006, R. Valenzuela 13173, 13175 (ENCB, CESUES).

COMMENTS— Within *Phellinus, P. glaucescens* belongs to the resupinate species complex, from which it is separated by the combination of basidiome color, small pores, the presence of hymenial setae, and spore size, shape, and color. A similar species that has been cited from the area, *Inonotus tropicalis* (M.J. Larsen & Lombard) T. Wagner & M. Fisch. (Raymundo et al. 2009), has a resupinate basidiome, small pores, and similar basidiospores but is distinguished by its annual to biennial fruiting pattern, fasciculate or clustered hymenial setae, and a monomitic to pseudodimitic hyphal system.

Phellinus shaferi (Murrill) Ryvarden, Norw. Jour. Bot. 19: 235, 1972. FIGS 16–20

BASIDIOMES perennial, 90–140 × 40–70 × 4–7 mm, resupinate, widely effused, adnate, tough to woody. MARGIN sterile, up to 1 mm wide, brownish yellow (5C7), golden brown (5D7) to light brown (6D8), dark brown (6F5) to black with age, matted, fimbriate. HYMENOPHORE poroid, cracked with age, PORES circular to angular, 5–6 per mm, yellowish brown (5E7) to reddish brown (8E8), dark brown (6F7) with age, edges thin and entire; TUBES up to 3 mm deep, tough to woody, yellowish brown (5E7) to reddish brown (8E8). CONTEXT or subiculum up to 1 mm thick, yellowish brown (5E8) to reddish brown (8E8), fibrous, tough, azonate.

HYPHAL SYSTEM dimitic, GENERATIVE HYPHAE simple septate, hyaline to pale yellow in KOH, simple to slightly branched, thin-walled, 2.4–3.2 µm in diam; SKELETAL HYPHAE golden brown to reddish brown, unbranched, thick-walled, 2.4–5.0 µm in diam. HYMENOPHORAL TRAMA with slightly interwoven hyphae, generative hyphae hyaline to pale yellow in KOH, thin-walled, simple to slightly branched, 2.4–3.2 µm wide; skeletal hyphae golden brown to reddish



Figs 11–20: ***Phellinus glaucescens***: 11. Basidiospores. 12. Hymenial setae. 13. Hyphae of hymenophoral trama. 14–15. Basidiomes. ***Phellinus shaferi***: 16. Basidiospores. 17. Cystidioles. 18. Hymenial setae. 19. Hyphae of hymenophoral trama. 20. Resupinate basidiome.

brown in KOH, unbranched, thick-walled, 3.2–5 µm in diam. CONTEXTUAL TRAMA with slightly interwoven hyphae, generative hyphae hyaline to pale yellow in KOH, simple to scarcely branched, thick-walled, 1.6–2.4 µm wide; skeletal hyphae yellowish brown in KOH, unbranched, thick-walled, 2.4–4.0 µm in diam. HYMENIAL SETAE 16–22.4 × 5.6–9.6 µm, ventricose to ventricose-rostrate, reddish brown to dark brown, thick-walled. CYSTIDIOLES 24–26 × 7.2–8.8 µm, subulate to ventricose-rostrate, hyaline in KOH. BASIDIA not observed. BASIDIOSPORES 4–4.8 × 3.2–4.0 µm, subglobose, pale yellow to rusty brown in KOH, inamyloid, thin-walled, smooth.

ECOLOGY & DISTRIBUTION — Solitary, growing on dead angiosperm wood in tropical deciduous forests. Previously known from Montserrat in the West Indies, Panama, and Venezuela (Ryvarden 2004), in México *P. shaferi* was found in Sonora State.

REPRESENTATIVE SPECIMEN EXAMINED — **MÉXICO. SONORA: municipality of Álamos**, El Aguaje (26°56′45″N 108°45′48″W) elev. 462 m, 14.IX.2006, R. Valenzuela 13099 (ENCB, CESUES).

COMMENTS— *Phellinus shaferi* is characterized by its resupinate basidiomes, pore size and shape, and basidiospore size and color. It is separated from *P. glaucescens* by small pores (6–8 per mm). We follow Ryvarden (2004) in placing this taxon in *Phellinus*, until molecular studies confirm whether it would be better retained in *Fuscoporella*.

Acknowledgments

We wish to express our gratitude to Dr. Gabriel Moreno and Dr. Clarice Loguercio-Leite for reviewing the manuscript and their useful comments. We also express our gratitude to SEMARNAT- CONACYT (Grant 2002-C01-0409) for their financial support. Valenzuela and Decock acknowledge the financial support from CONACyT (México) and FNRS (Belgium), in the framework of the bilateral cooperation agreement that allowed fieldwork in México, and a research visit of R. Valenzuela and T. Raymundo at MUCL in 2011. R. Valenzuela and T. Raymundo thank COFAA and IPN for the financial support for their research in the project SIP-20121207 and UNAM (PAPPIT) for financial support in the project IN- 207311. Cony Decock gratefully acknowledges the financial support received from the Belgian State–Belgian Federal Science Policy (contract BCCMC3/10/003). Silvia Bautista Hernández from the ENCB (IPN), kindly prepared the final version of drawing lines. Aldo Gutierrez (CIAD) kindly prepared the final version of the pictures and text.

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